

Science Forum

South Africa 2024

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science, technology & innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA



Speech by the Minister of Science, Technology and Innovation, Prof. Blade Nzimande, opening Science Forum South Africa 2024



THE STRATEGIC IMPORTANCE OF THE SFSA 2024

The Science Forum South Africa (SFSA) was first convened in 2015 with the view to provide Africa with an “open science” event similar to ones hosted in other parts of the world. Today, the SFSA is the largest and most prestigious event of its kind on the African continent.

This forum continues to serve as a platform for dynamic debate among key stakeholders in our local and global scientific communities. It also seeks to advance the

African open science agenda to promote a socially-just, democratic, and more equal world in which Africa can play its rightful part in the making of a sustainable future for all. Therefore, a critical part of SFSA is the strengthening and creation of local, regional and international science networks and partnerships. I must also emphasise the distinguishing features of SFSA.

Firstly, participation at SFSA is open to all and free of charge. This gives concrete expression to our commitment to “open science” – and not something being given lip service to. Secondly, SFSA has a strong focus on the historically specific context of African science and the role scientists are playing in promoting a scientific and technologically-enabled future for the continent and its place in the world.

And thirdly, the SFSA also has a strong youth focus, as they have to take the lead in the future of African science, technology, and innovation. The SFSA brings together more than 80 countries, with more than 4000 participants registered for 2024.

One of the highlights of this year was an address by our country’s former Minister of Science and Technology, Dr Naledi Pandor. She reflected on the evolution of science, technology, and innovation, over the past 30 years of our democracy.

I was also grateful that the Forum programme supported our national campaign of 16 Days of Activism for No Violence Against Women and Children, with a dedicated session to present and discuss the results of a major national research effort to better respond to the scourge of gender-based violence in South Africa. As in the past, the SFSA programme offered participants a diverse range of discussion themes co-created with the national system of innovation community and global partners.

In total the SFSA 2024 convened three plenary sessions, 68 panels, 30 side events and 80 exhibitions. The 68 panels covered themes such as youth in science, technology and innovation, science, technology, and innovation partnerships and the G20, and science and economic diplomacy.

The other discussion themes included industries of the future, global science for humanity, science communication and journalism, and enabling the potential of science, technology and innovation.

Equally exciting was the side events which included the African Union event on Youth Innovation, a masterclass in science diplomacy presented by the Science Diplomacy Capital for Africa platform, and a training programme for the science journalists of Southern Africa.

THE LAUNCH OF THE FIRST REPORT OF THE SOUTH AFRICAN PUBLIC RELATIONSHIP WITH SCIENCE SURVEY

Another vital component of the SFSA was science engagement and, for this reason, we used the occasion of SFSA 2024 to launch South Africa's first report on the South African Public Relationship with Science Survey.

Through our 2019 White Paper on Science, Technology, and Innovation, we committed to creating suitable metrics to gauge our progress in relation to science engagement. This is why we asked our entity, the Human Sciences Research Council, to independently conduct the South African Public Relationship with Science Survey.

PUBLIC RELATIONSHIP WITH SCIENCE SURVEY

The survey seeks to enlighten us on how we are faring as a country in the area of science engagement and, accordingly, makes a number of important observations.

The digital version of the report is available on several websites, including those of our department and that of the Human Sciences Research Council. I wish to encourage all our stakeholders to obtain this report. We also intend to solicit the opinions of our stakeholders through stakeholder engagement sessions that will be announced soon. This is the first report of its kind in the history of our country, and we regard it as an important enabler of our department's science engagement programme.

Ladies and gentlemen, it is now my honour and privilege to formally announce the release of the 2022 South African Public Relationship with Science Survey report.

USING SCIENCE TO IMPROVE THE HUMAN CONDITION

We recognise and embrace the fact that South Africa is part of the African continent and the world and further believe that whatever we do in the area of science must be guided by this understanding. Today, we live in an epoch that is witnessing some of the most breathtaking technological innovations in such areas as information and communication technologies, biotechnology and personalised medicine, generative AI, quantum computing, robotics, and automation, blockchain and decentralised technologies, and others.

However, what is also true is the disturbing fact that we also live in one of the most unequal times in human history. All credible inequality indices point to the fact that about 10% of the world's population owns over 70% of the world's wealth and that this same 10% also takes over 50% of the global income and is responsible for over 40% of global carbon emissions.

This is completely antithetical to the very claims being made about "democracy" and "freedom" in politics. We turn to the SFSA to develop concrete ideas on how we can successfully transform the relations of inequality within our continent, its place in a changing global order, and the very nature of that global order. The recently adopted United Nations Pact for the Future with its 56 action steps, in which science, technology and innovation play a catalytic role, should be a framework of reference in our work.

ADDRESSING AFRICA'S CHALLENGES THROUGH SCIENCE

Africa's ability to realise its full potential continues to be impeded by a number of historical and structural factors, and more particularly the persisting legacies of colonial underdevelopment.

One of the things we need to change is how we engage with the rest of the world as the African continent, not just in the area of science, but in all areas of human development. As science policy makers on the African continent, we cannot perpetuate an international relations approach that continues to reduce Africa to a mere supplier of natural resources and skills for the other regions of the world.

Therefore, one of the areas I believe we must give critical attention to is the funding of research in Africa and the development of a sovereign African research agenda. We cannot have an African research agenda funded, in the main, by donors, regardless of their stated intentions.

We need to have research funding mechanisms that are designed and financed by Africans and totally committed to the African Union's Agenda 2063, and for our genuine friends to support such an effort.

The issue of research funding is critical for the strengthening of Africa's scientific capacity and technological sovereignty to tackle our continent's disease burden by among others developing pandemic preparedness capacity, increasing access to education, water, and energy, and addressing new challenges such as climate change and digital inequality.

It is therefore critical that SFSA express and mobilise greater support for the implementation of the Africa Union's Science, Technology and Innovation Strategy for Africa (STISA). STISA provides our continent with a useful framework for the development of science, technology, and innovation in Africa.

SOUTH AFRICA'S KEY STI ADVANCES/SUCCESSES IN RECENT YEARS

Since the dawn of democracy in South Africa, we have made a number of commendable strides in our efforts to enhance our country's capabilities in science, technology and innovation.

As a result of these investments, our share of global research output (0,98%) has increased and making a difference in areas such as health innovation (HIV/Aids), developing rural livelihoods and international big science projects like the Square Kilometre Array (SKA). However, this is far from our true potential.

At the height of the Covid-19 pandemic, it was African scientists, here in South Africa, who first identified and sequenced the genome of a new and virulent SARS-CoV-2 variant, later named 501Y.V2.

This pioneering work gave the global pandemic management community crucial time to put in place measures to control its spread and to develop new vaccines and therapies. This work was largely funded by our Department of Science, Technology and Innovation and based at our public universities and science councils, which are fully committed to "open science" and "science for the public good".

We have developed our Vaccine Innovation and Manufacturing Strategy, whose main aim is to develop capacity for vaccines development in our country, especially those vaccines needed on the African continent. Enormous advances have already been made in this regard, notably now having the capacity to produce a lot of vaccines here in South Africa!

Some of these successes I am mentioning formed part of the exhibitions of SFSA 2024.

PLACING SCIENCE, TECHNOLOGY AND INNOVATION AT THE CENTRE OF GOVERNMENT, INDUSTRY AND SOCIETY

Guided by our two overarching science, technology and innovation policy guides – our 2019 White Paper on Science, Technology and the Decadal Plan for Science, Technology and Innovation for the period 2022 to 2032, over the next five years, we will continue to use science, technology and innovation to address South Africa's development priorities.

To this end, as the Department of Science, Technology and Innovation, we have recently adopted as our guide to action, our mantra: Placing science, technology, and innovation at the centre of government, society and industry.

In furtherance of this call to action, South Africa will continue to invest in research and the development of technologies in key economic sectors such as energy, agriculture, mining, health, and the circular and digital economies.

As part of driving health innovation, one of our priorities is to ensure South Africa develops credible pandemic preparedness capacity, more specifically local vaccine manufacturing capacity. We have already finished the development of our Vaccine Innovation and Manufacturing Strategy (VIMS) framework. Our focus on developing local vaccine development and manufacturing is informed by a number of strategic considerations.

As a country and continent, we cannot continue normalising the negative power dynamic where the entire African continent continues finds itself at the mercy of foreign pharmaceutical companies, for the provision of life-saving vaccines to our own citizens.

South Africa will also continue investing in the production of critical high-end skills. Last year our President, His Excellency Cyril Ramaphosa, announced the establishment of the Presidential PhD Programme.

Through this Programme, we seek to increase the number of highly skilled individuals in high priority areas by exposing South Africa's most promising minds to the best (and most relevant) universities, private facilities, and industries in other parts of the world.

Once they have received this training and exposure, we want these young scientists and researchers to come back and use whatever they have learned to help address South Africa's development challenges, including enhancing our country's scientific capabilities.

As the Department of Science, Technology and Innovation, all our science, technology, and innovation interventions of are course aimed at supporting our country's apex development priorities which were articulated by our President at the opening of Parliament in July this year. These national priorities are –

- inclusive growth and job creation;
- reducing poverty and tackling the high cost of living; and
- building a capable, ethical, and developmental state.

BUILDING A JUST WORLD THROUGH SCIENCE

In conclusion, guided by our country's international policy, we will continue deepening strategic global partnerships with a priority focus on the African continent and the Global South.

Our President Cyril Ramaphosa, formally briefed the country on South Africa's G20 presidency. We will certainly be looking at ways in which SFSA 2024 can be used to support and advance South Africa's G20 priorities in 2025.

Science and society are indivisible, and scientists cannot be oblivious or neutral to injustices taking place around them. This is especially true for Africans, given the long history of colonialism and racism, in which science itself was used as tools of subjugation and exploitation.

Therefore, we will continue to use science diplomacy to foster social justice and human solidarity. In July this year, I formally announced a new programme to enable cooperation in science, technology and innovation between South Africa and Palestine.

The programme will also have as special focus support for safeguarding, rebuilding and developing Palestine's research and innovation capacities and infrastructure.

The programme will be implemented by the National Research Foundation (NRF) and will entail a number of elements. The NRF has already published a call for expressions of interest for South African organisations, including universities and civil society not-for-profit organisations, to submit proposals for collaborative actions with Palestine.

Although South Africa will provide all funding, our department will seek to work closely with the Palestinian Ministry of Higher Education and Research on its implementation. We will approach other countries, together with international organisations like UNESCO, to join this effort.

There is credible evidence that scientific inventions continue to be used to fuel wars, genocide, and the destruction of precious human civilisations, and for this reason, as the scientific community in South Africa and Africa, we cannot endorse the view that says science must be neutral in the midst of injustice.

Besides, neutrality in the face of prevailing injustice is a tacit endorsement of injustice. Therefore, we must use the tools and language of science to speak truth to unjust power and forge solidarity with all peoples under threat of genocide and subjugation.

President Ramaphosa also used the opportunity to outline South Africa's G20 priorities, which are as follows: inclusive economic growth, industrialisation, employment and reduced inequality, food security, artificial intelligence, data governance, and innovation for sustainable development.

The President also emphasised the importance of ensuring that we use our G20 Presidency to ensure the needs of the African continent and the Global South enjoy priority on the international development agenda.

We are excited to be hosting the World Conference on Science Journalists from 1 to 5 December 2025, also held here at the CSIR. We wish to express our gratitude to the South African Association of Science Journalists as well as the World Federation of Science Journalists for their support, to ensure that we put science at the centre of government, industry and society.

In conclusion, Science Forum South Africa is a prestigious gathering that provides us with the unique opportunity to continue interrogating the value of science to humanity and to be more deliberate and forceful about using science to create a more equal and just world.

It is therefore my sincere hope that all delegates will adopt this as our agenda as we continue to build a better Africa and world through science. Science Forum South Africa 2024 officially open.

Thank you.

Science Forum South Africa remains a firm favourite

Despite scorching temperatures in Pretoria, large crowds flocked to the Council for Scientific and Industrial Research (CSIR) International Convention Centre to attend this year's Science Forum.

The Minister of Science, Technology and Innovation, Prof. Blade Nzimande opened the 2024 Science Forum South Africa (SFSA) on Tuesday, 3 December 2024. Hundreds of people packed the auditorium for the opening of the ninth SFSA. The Minister thanked the delegates for their continued support of the forum and said that a critical part of SFSA is the strengthening and creation of local, regional and international science networks and partnerships.

Co-hosted by the Department of Science, Technology and Innovation (DSTI) and the Science Diplomacy Capital for Africa initiative, this year's event focuses on climate change, food security, health care and energy challenges. With the many crises facing the world today, the interface between science and society has never been more important. Taking place under the theme "Igniting conversations about science – innovation and science for humanity", the event draws together the scientific community, government, industry and civil society for discussions on the role of science in society.

"We are witnessing some of the most breathtaking technological innovations in such areas as information and communication technologies, biotechnology and personalised medicine, generative artificial intelligence, quantum computing, robotics and automation, blockchain and decentralised technologies, and others," said Minister Nzimande.

The Minister said, however, that, while the world is rapidly advancing, inequality is increasing.

"It is a disturbing fact that we also live in one of the most unequal times in human history. All credible inequality indices point to the fact that about 10% of the world's population owns over 70% of the world's wealth; and that this same 10% also takes over 50% of the global income and is responsible for over 40% of global carbon emissions." According to the Minister, platforms like the SFSA can help develop concrete ideas on how to successfully transform the relations of inequality within our continent, its place in a changing global order, and the very nature of that global order.

SFSA 2024 is also taking place as South Africa celebrates 30 Years of Freedom. The Minister said that since democracy, South Africa has made key advances in science, technology and innovation – which were particularly significant during the Covid-19 pandemic.

"At the height of the Covid-19 pandemic, it was African scientists, here in South Africa, who first identified and sequenced the genome of a new and virulent SARS-CoV-2 variant, later named 501Y.V2."

This pioneering work gave the global pandemic management community crucial time to put in place measures to control its spread and to develop new vaccines and therapies. "This work was largely funded by our DSTI and based at our public universities and science councils who are fully committed to open science and science for the public good," said the Minister.

The CEO of the CSIR, Dr Thulani Dlamini, echoed these sentiments in his welcoming remarks, saying science is more than just a pursuit of knowledge, it is a powerful tool that has the potential to shape the future of humanity.

"Science, when applied with wisdom and empathy, becomes a means for social, economic, and environmental progress that benefits not only the present but also generations to come," said Dr Dlamini.

The crowds continue to pour in with day 2 equally packed for the keynote address delivered by former Minister of Science and Technology, Dr Naledi Pandor. Dr Pandor celebrated the country's progress in building a world-class and impactful science system. The development of science technology and innovation in South Africa has marked steady advances in palaeontology, astronomy, biotechnology, laser science and artificial intelligence.

"One of the best decisions made by newly democratic South Africa in 1994 was to create a department dedicated to science, technology, arts, and culture. As this democracy matured an even more insightful decision was adopted - a fully-fledged department of Science and technology."

Looking back, Dr Pandor said it was interesting to look at the country's beginnings as a democracy to understand its progress and failings. This year's programme featured three plenary lectures and 68 sessions involving leading South African and international scientists, experts and thought leaders. There is also an exhibition featuring key institutions and partners in the national system of innovation.

African youth play pivotal role in innovation, entrepreneurship

More than 60% of Africa's population is under 25 years old and by 2030 young people in Africa are expected to make up 42% of the world's youth.

With Africa's growing youth bulge, the need to invest in young people is becoming more urgent by the day. Now, more than ever, governments need to invest in young people to ensure they have access to technology education, skills development and opportunities.

On 2 December 2024, the Deputy Minister of Science, Technology and Innovation, Ms Nomalungelo Gina, called on governments, industry and educational institutions in Africa to help young entrepreneurs transform innovative ideas into viable businesses.

The Deputy Minister made the call for financial, technical and policy-driven support during the Youth in Innovation Symposium on Artificial Intelligence and Emerging Technologies, which was held in Pretoria as part of the lead up to the 2024 Science Forum South Africa (SFSa). Deputy Minister Gina told the symposium that young people have the potential to solve problems and lead sustainable development and transformative change in Africa.

The Department of Science, Technology and Innovation (DSTI) organised the event in partnership with the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) and the United Nations in South Africa.

The gathering was aimed at empowering young innovators by fostering discussions on the transformative potential of emerging technologies to address pressing challenges like food security, poverty and climate change.

The Deputy Minister noted that, by 2050, Africa will be home to over a quarter of the global youth population, a demographic dividend that could fuel unprecedented economic and social transformation.

This aligns with the African Union's 2024 theme for education, "Educate and Skill Africa for the 21st Century", which emphasises the importance of inclusive, lifelong learning in building resilient education systems across the continent. As part of the theme, AUDA-NEPAD launched the Africa Skills Revolution Competition, which is benefiting young innovators such as Rwandan engineer Aline Niyomubeyi, whose innovation exemplifies how technical skills can drive innovation.

During the Covid-19 pandemic, she and her team developed a mobile application enabling commuters to book tickets remotely, reducing unnecessary travel and improving daily planning. Niyomubeyi, a graduate of a technical and vocational education and training programme, has a passion for technology and problem-solving, and her journey should inspire other young people and women to use technology for positive change.

Despite significant challenges such as limited access to financing, infrastructure and skilled professionals, the Deputy Minister remains optimistic about the future. She cited Africa's advancements in digital technology and the growing impact of artificial intelligence-driven initiatives across the continent as reasons for hope.

Through various programmes and partnerships, such as the DSTI's Innovation Fund and the UN Women's African Girls Can Code initiative, the South African government is helping to nurture the youth's talent and expand access to technology and innovation education and mentorship.

Grassroots innovators rewarded for using science, technology and innovation to address challenges

Fifteen grassroots innovators whose technologies and solutions drive socio-economic development and job creation in South Africa were honoured at the 2024 Grassroots Innovation Programme (GIP) Awards on Thursday, 5 December. The gala dinner event was part of this year's Science Forum South Africa and recognised the contributions of individuals with disabilities.

The GIP is an initiative of the Department of Science, Technology and Innovation (DSTI), implemented by its entity, the Technology Innovation Awards (TIA), to support inventors and innovators who may lack formal education or access to formal innovation facilities.

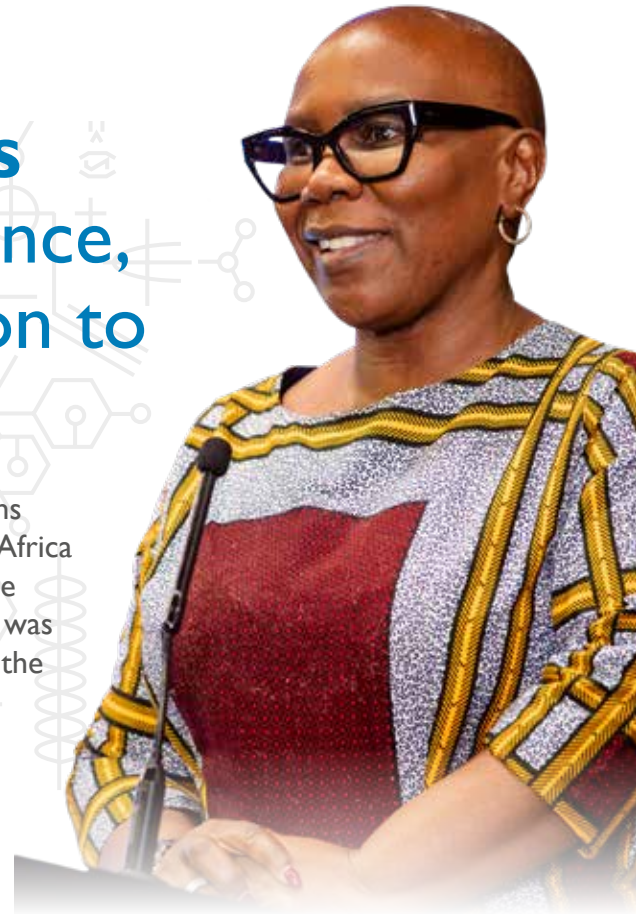
Addressing the occasion, the Deputy Minister of STI, Ms Nomalungelo Gina, praised the TIA's efforts to grow and support young innovators.

"I appreciate the good work that has been done by the TIA, but above it all I appreciate the work done by all the small, medium and micro enterprises and the entrepreneurs that are here today to make sure the country creates the economy that works for everyone," said the Deputy Minister.

For the first time since its inception in 2019, the TIA has created a category to celebrate innovators who show exceptional commitment to the inclusion of people with disabilities.

This initiative, the Deputy Minister said, resonated with her. "As a woman and a person living with a disability who has faced exclusion in many ways, I am inspired by the opportunities being created here. These opportunities empower individuals to innovate, support themselves, and make meaningful contributions. Let us continue to embrace and expand these efforts wholeheartedly."

Ms Shakila Maharaj received the first prize in the 2024 Disability Innovation Award for developing the ShazaCin Accessible Media mobile app, which acts as an access tool and an art form that uses the spoken word to make the visual world accessible to blind people. Sydwell Sihlangu, scooped the Grassroots Innovator of the Year award, for his African Hut Mushroom Dome innovation.



The structure provides a micro-climate that enables the production of mushrooms at a lower cost than the conventional commercial mushroom production structures.

Ms Gina admitted that there are challenges, particularly with funding for innovation, "but hearing a woman share her journey and aspirations tonight fills me with hope. It shows the impact of the opportunities provided. To the TIA team, thank you for making this possible, even with the constraints you face. Your efforts are truly appreciated."

In the coming weeks, the TIA will be launching two special programmes – Women in Innovation and Innovation for Persons with Disabilities – and has called on potential funders to partner with government in taking the country forward.

The winners of the GIP Innovation Awards are as follows:

- Annemarie Bremmer
- Keletso Lekwakwe
- Nkosinathi Mbele
- Shakila Maharaj
- Thulile Mthethwa
- Innovate Durban Living Lab
- Sydwell Sihlangu

30 years of Science Technology and Innovation in Democratic South Africa. Progress and challenges.

DR NALEDI PANDOR,
4 DECEMBER 2024



THE BEGINNINGS

South Africa's science technology and innovation system has made commendable progress in the thirty years of democracy alongside immensely troubling and stubborn challenges. In the Kaplan report of 1996, it was indicated that while South Africa had considerable scientific and technological capabilities, the new democratic government inherited a system which harboured considerable resistance to change and one that would operate under significant economic constraints.

The report offered policy advice to the new democratic government suggesting it works to develop a Science and Technology system which would simultaneously support the emergence of an internationally competitive business sector and the enhanced provision of infrastructure such

as, housing, clean water and domestic electricity. It argued that addressing the legacy of inequality had to be a key focus of government, and that a fundamental refocusing of existing science and technology activities and a novel inclusion of civil society in supporting and framing policy priorities in this sector.

The idea of inclusion in some form was confirmed by the esteemed professors who presented at one of the early meetings of the portfolio committee in the National Assembly. They were the leaders of the then Science Academy and were keen to alert MPs to the importance of academic freedom to Science and Technology and also to advance interest in disciplines politicians may not regard as relevant to development. Among these were astronomy sciences, certain mathematics and physical science projects and too concentrated a focus on diversity.

The portfolio committee was fortunate in being chaired by a respected revolutionary poet (Mongane Serote) and included a renowned activist mathematics professor (Professor Mohammed). Also noted in the report was a concern that in much of the continent there was inadequate science infrastructure and funding and that while international cooperation enhanced performance, intra- African cooperation would be minimal.

At the 1995-96 date the budget for the department was around 2,8 billion rands (800 million dollars approximately). The budget has more than doubled in the thirty years but has not reached nor exceeded the target of at least one per cent of GDP devoted to science and innovation.

Despite the inadequate funding South Africa has marked important areas of progress. This is largely due to excellent research universities, science agencies skilled scientists and a keen and bright youthful science population.

Important capacity has been achieved in astronomy capabilities. The Square Kilometre Array project is the best known example, alongside the Meerkat, the SALT telescope initiative and the Satellite Centre. Big data computing skills engineering feats and exciting imagery of dark matter are all outcomes of this area of science and innovation. The SKA is iconic for these reasons and for the excellent Africa wide Collaboration and the global partnerships that create the best science.

Alongside SKA the bold decision of the sector to mirror the Canada research chairs initiative has been a significant boost for the sector. Over 180 research chairs focussed on diverse fields such as food security, health, human development, social sciences, energy and biodiversity. The departments efforts to ensure women researchers access this programme has been an affirmation of the wide breadth of talent we have in South Africa.

The CSIR, our host has played a leading role in advancing innovation in our system. Its work in AgroSciences bio engineering, advanced manufacturing, and outstanding support in the response to covid has been outstanding. Women scientists in this institution lead on health research food security and water safety.

Two years ago, the department began a hydrogen energy initiative to support science institutions and the private sector in becoming leaders in the hydrogen economy. Experienced gained through the hydrogen South Africa Strategy initiative is contributing immensely to the hydrogen energy work. South Africa as a rich source of platinum will play a central role in a hydrogen derived clean energy strategy.

The South African innovation sector benefits from institutions such as the Academy of sciences or ASSAF and the CSIR, the NRF, the South African Council for Natural

Scientific Professions (SACNASP), the National Space Agency and the Technology Innovation Agency. Smaller allied agencies contribute to the work of these institutions and to our universities and universities of technology that are all striving to improve their research and teaching profiles.

Our challenges remain a worrying decline in resources and a growing wariness among young researchers about the viability of pursuing a full-time research career. The sector is also sadly not immune from the impact of the current toxic geopolitical environment. South Africa's support for the struggle for sovereignty has resulted in some key research initiatives that rely on international funding, facing the threat of funds being withdrawn. This is reportedly happening to universities that have decided not to pursue links with institutions in Israel that have links to the military actions in Palestine. The department needs to give attention to the likely impact of such funds withdrawal on institutions and researchers and support them in identifying alternative resources. Disciplines that advance research in novel areas such as genetics and women's health especially reproductive health, require increased support to help advance our development goals. Fortunately, we do have a proactive department and leadership in science technology and innovation.

One of the most important areas of success recently was the work done by South African scientists in identifying a Covid-19 virus variant (Omicron), and thus alerting the globe early to this threat. That discovery placed South African researchers and their collaborators at the apex of science excellence. This is the kind of advance our government must continue supporting and investing in.

One of the areas of distress is the continuing inadequate continent-wide investment in science and technology. Lack of resources has led to us losing talent to the North, we need to establish modes of collaboration with the African diaspora and work more closely together to advance Agenda 2063, the Africa we want. Our future is set out in this agenda and in the AFCFTA. These instruments envision a prosperous industrialised productive Africa, we need science and innovation to come to life throughout Africa for these ambitions to be realised, this forum provides a fantastic opportunity for concrete project formulation. The forum must not be a mere talk shop, it must play a full role in advancing African capabilities and ensuring that Africa rising becomes a reality and not a populist slogan.

I wish to conclude by congratulating the ministry for continuing this Africa led collaboration on science technology and innovation. I wish the forum well.

Thank you.



African states working together to address food system challenges

Triple challenges of poverty, inequality and unemployment continue to beset the African continent and, with large proportions of the population relying on agriculture not only for their food but also for their livelihoods, the issue of climate change and its impact presents a huge challenge.

These issues were tackled during the “Accelerating Food Systems Transformation in Africa” session, a side event that took place as part of the Science Forum South Africa. Organised by the Human Sciences Research Council, the session involved various think tanks.

The African Research Universities Alliance Centre of Excellence in Sustainable Food Systems (ARUA-SFS) is led by the University of Pretoria (UP), in collaboration with the University of Ghana, Legon, and the University of Nairobi. ARUA-SFS aims to connect Africa’s talented researchers with each other and the global academic community to collaboratively identify solutions to the food systems challenges of our time.

ARUA strongly believes in collaboration and a multi-disciplinary approach, particularly because the effects of climate change are enormous and cut across sectors. “The majority of our researchers come from various disciplines including animal science, food science, engineering, information and communication technology and other areas. They are capacitated with skills to be able to communicate with stakeholders and break the barriers that we have always had between science and community,” said Dr Elizabeth Mkandawire, a Network and Research Manager for Food Systems Network in Africa (FSNet-Africa) at UP. FSNet-Africa is an ARUA-SFS flagship project.

ARUA draws its members from East, West and Southern Africa, and two historically disadvantaged South African universities as associate members (the Universities of the Western Cape and Fort Hare), as well as a broader consortium of African and international partners working on food security research, policy and capacity development. “We do these through the FSNet-Africa model, which aims to design and implement food systems research

in partnership with stakeholders to identify solutions that can bring about sustainable change in African food systems.” FSNet-Africa comprises 10 academic partners from Ghana, Kenya, Tanzania, South Africa, Malawi and Zambia. UP and the University of the Western Cape are the South African partners, and they also co-host the Department of Science, Technology and Innovation – National Research Foundation (DSTI-NRF) Centre of Excellence in Food Security.

“Importantly, in each of the countries, we work with the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN). They enable us to connect with the food system stakeholders in non-governmental organisations, farmers’ organisations and policy makers. In South Africa, FANRPAN introduced us to the National Agricultural Marketing Council, which helped our researchers to connect with stakeholders from different aspects of research,” says Dr Mkandawire.

Their goal is to conduct research that is impactful. “We want to build the next generation of researchers that will not only be able to conduct research across disciplines but also with stakeholders. And this way we will create networks that cut across Africa, between Africa and the world, career phases, disciplines and, importantly, networks between academia and society that collaborate to tackle challenges holistically.”

Networks that cut across Africa are important for regional learning and knowledge exchange as well as for building networks and collaboration skills of early researchers.

“We strengthened international networks with our connection to the University of Leeds and, through the FANRPAN, we were able to connect with the food system stakeholders that assisted with feedback from



the stakeholders regarding the type of research projects needed and how to tackle them.”

She mentioned a successful research project in which one of their fellows disseminated research findings with the stakeholders. “The fellow has been collaborating with the moringa farmers to understand the benefits of using moringa in animal feed as a substitute for antibiotics. Together they were able to share the findings to a group of 108 farmers, many who are now taking up either moringa farming, or even experimenting with the use of moringa in their animal feed,” she said.

One of the biggest advantages of FSNet-Africa is that it is transferable. “While our projects focused on food systems, it can be adapted to any challenges, including health and climate. Currently, we are going to apply the same model to our other five to ten-year projects that will be capacitating PhD candidates,” she said.

The critical elements when transferring this mentorship model are to have a research committee rather than one supervisor and explicitly include

stakeholders as part of the research team. “Early and continued engagement of stakeholders has become a new way of doing all the research we conduct.”

With the deadline of the UN’s Sustainable Development Goals coming up in the next six years, Dr Mkandawire said Africans must step up and play their part in influencing the next global agenda.

“We at ARUA-SFS and FS-Net Africa believe that if Africans are going to influence the next global agenda and not just buy into an agenda that makes assumptions about our aspirations, development goals and needs, then we need to speak with one voice. To do that, we have a responsibility as researchers to generate insights and information from the stakeholders with whom we engage. We believe that the FS-Net Africa model works,” she said



DRIVING DIGITAL INNOVATION AND INCLUSION:

Forge Academy's commitment to STEM and skills development

Every year, South Africa's premier science engagement gathering, Science Forum South Africa, serves up interesting and engaging content – and this year was no different. From pioneering research to innovative products and systems, the new projects on display are often the talk of the forum.

In a groundbreaking initiative to reshape the landscape of science, technology, engineering and maths (STEM) education and digital skills development, Forge Academy, in partnership with the Finnish Embassy, is making significant strides in technological innovation and youth

empowerment. This collaboration is more than just a bridge between nations; it is a vision realised to democratise access to futuristic education and opportunities for learners across the world.

One of Forge Academy's standout projects is the development of custom virtual reality (VR) training solutions. Among these innovations is a state-of-the-art VR chemistry lab tailored for schools. This solution not only reduces the cost of physical laboratory setups but also provides a safe, immersive and hands-on learning experience for students. Mr Jabulani Mashimbye, IT Support Technician at Forge Academy, said that their VR chemistry lab is just the beginning of how technology can provide world-class education to communities where resources are limited. In addition, VR allows us to reimagine education entirely. Forge Academy leverages multi-robot technology in classrooms, equipping learners with critical coding skills and exposing them to a broader spectrum of careers beyond traditional programming. This approach fosters creativity and problem-solving skills, preparing young minds to navigate a world increasingly driven by automation and artificial intelligence.

"Our goal is to ensure that young learners not only understand technology but also see it as a tool to create solutions for the challenges their communities face," said Mr Mashimbye.

The academy's work extends beyond education into groundbreaking technological advancements. By venturing into 3D printing and the development of robotic arms for automated farming, Forge Academy is committed to fostering innovation in industries critical to economic growth.

"We are helping young people become creators, not just consumers, of technology. Through projects like automated farming, they can see how technology impacts real-world challenges, from food security to industrial efficiency," added Mr Mashimbye.

A key partner in this transformative journey is the Media, Information and Communication Technologies Sector Education and Training Authority (MICT SETA), established under South Africa's Skills Development Act of 1998. Together, Forge Academy and MICT SETA are championing digital skills initiatives in VR, robotics, cloud computing, artificial intelligence, and machine learning.

"This partnership with MICT SETA allows us to expand our reach and break the barriers often associated with STEM fields; we're proving that young people from any background can be innovators and leaders in the digital economy," said Mr Thabang Mkhuma, Technical Advisor: 4IR at MICT SETA.



The partnership highlights the untapped potential of young people in rural and township communities, proving that innovation and participation in the digital economy are within reach for all. Forge Academy is committed to scaling its initiatives nationwide. By extending its reach, the academy aspires to support more young people, particularly those from disadvantaged backgrounds, in pursuing STEM education and careers. Through tailored programmes, mentorship, and cutting-edge tools, Forge Academy is paving the way for a more inclusive and digitally proficient workforce.

"We believe that STEM education is a gateway to transformation. By equipping young people with digital skills, we're not just opening doors for them; we're giving them the keys to shape their own futures," said Mr Mkhuma.

By investing in digital skills and fostering innovation, Forge Academy is not only shaping the future of education but also transforming the lives of countless young South Africans, enabling them to thrive in the digital age.

"Our mission is to create a generation that doesn't just consume technology but drives innovation. Through collaboration, innovation and inclusion, we're ensuring that no one is left behind in the digital revolution," said Mr Mkhuma.

With initiatives like these, Forge Academy exemplifies how strategic collaboration, innovative technology, and an inclusive approach can empower the next generation to lead and succeed in a rapidly evolving world.

Nginyaqonda!

literacy app to boost home-language education in South Africa

Poor reading skills in South Africa's foundation phase prompted senior researcher at the Council for Scientific and Industrial Research (CSIR), Dr Laurette Marais, to develop a pilot project to address the alarming literacy challenges.

Nginyaqonda!, an innovative literacy app, aims to help foundation phase learners develop reading comprehension skills in their home languages, an essential step toward building a strong educational foundation.

Dr Marais showcased her innovative app at the Science Forum South Africa 2024. The app drew huge interest from thousands of people who visited the exhibition.

Drawing on curriculum-aligned content and leveraging the CSIR's advancements in local language text and speech technologies, Nginyaqonda! offers an engaging platform for children to practice reading in a playful yet structured manner. The app generates thousands of interactive sentences, creating an immersive environment for learners to enhance their language proficiency and comprehension skills.

DR MARAIS BELIEVE THE APP IS MUCH NEEDED IN SOUTH AFRICAN SCHOOLS.

"This application integrates text and speech technologies into a dynamic user interface, delivered as an Android app. Its primary goal is to address a critical issue: 81% of South African children cannot read for basic meaning in their home language by grade 4.

This puts them at a significant disadvantage, as they struggle to understand the sentences in their textbooks, assignments or exams. Our technology seeks to bridge this gap by supporting literacy development in both home languages and English," said Dr Marais.

The app currently supports Sepedi, isiZulu, English and Afrikaans. Dr Marais and her team are optimistic about expanding the platform to include more of the country's 12 official languages, provided they can secure additional funding. This ambitious goal highlights the

CSIR's commitment to fostering inclusivity and equity in education.

"Our application is designed to be multilingual, reflecting the linguistic diversity of South Africa. By including text-to-speech technology that converts written text into audio and pronunciation scoring that evaluates learners' reading aloud, we aim to create an engaging and effective learning experience. This approach not only builds home language literacy but also strengthens English comprehension and reading skills," said Dr Marais.

Ms Agnes Dlamini, a primary school teacher, believes that tools like Nginyaqonda! can complement traditional teaching methods and provide children with additional resources to practice and improve their skills at their own pace.

Funded by the Department of Sport, Arts and Culture, the Nginyaqonda! project is a prime example of how cross-sector collaboration can drive educational innovation. The app is currently being tested in selected schools to gather feedback from both learners and teachers, which will inform its refinement and broader rollout. The CSIR team envisions Nginyaqonda! becoming a cornerstone of South Africa's efforts to address literacy challenges. By equipping children with the tools to read for meaning in their home languages, the app has the potential to transform educational outcomes and contribute to a more literate society.

The Nginyaqonda! literacy app represents a bold step toward addressing South Africa's literacy crisis. Its focus on home-language education and use of cutting-edge technology reflect an innovative approach to a persistent challenge. With further support and development, Nginyaqonda! could play a pivotal role in shaping a brighter future for South Africa's youngest learners.

For more information on the Nginyaqonda! Literacy app, please visit: <https://m.youtube.com/watch?v=gmQiqx8x0J8>

Deputy Minister lauds Science Forum South Africa 2024 a huge success

Science Forum South Africa 2024 was the first time I had the privilege to participate in this wonderful event. I have heard much about it, as our Department prepared for the event, and I am delighted to say that my expectations have been exceeded. I am therefore delighted to have the opportunity of delivering this closing address, and to personally thank everyone who contributed to the forum's success.



This afternoon's panel discussion captured the messages, which we will carry forward from this Forum, to put, as Minister Nzimande had called for on Tuesday, science, technology and innovation at the centre of society, government and industry. I also greatly appreciated the panel discussion's suggestions on how we can co-create

the Science Forum 2025, which will take place with the World Conference of Science Journalists a year from now. As our Minister emphasised in his opening address, we need to communicate more, and better, on the role of science in society, and I am confident that the forum in 2025, like this year, will continue to ignite conversations about science.

I would like to extend my warmest congratulations to the winners of the 2024 SFSA Exhibition Awards. I would also like to thank all exhibitors for your contribution to enable the dynamic networking, which is one of the hallmarks of the forum. The exhibition also played an important role in advancing our efforts to promote science awareness and understanding among the public at large – again one of the priority objectives highlighted by the Minister on Tuesday.

To the winners of the Science Diplomacy Awards, my gratitude goes for your efforts to harness international cooperation in science, to help making our world a more caring, a most just and a more sustainable one. Advancing South African science diplomacy, as our Minister outlined on Tuesday, is one of the key objectives of our forum.

On Tuesday Minister Nzimande, for example, spoke about our historic new programme to reinforce South Africa's solidarity with Palestine through cooperation in science, technology and innovation.

As we now conclude Science Forum South Africa 2024, it would be amiss for me not to

speaking about South Africa's G20 Presidency in 2025, which will be our major science diplomacy priority for the new year. South Africa officially assumed the G20 Presidency on 1 December, and on Tuesday President Ramaphosa announced the theme, priorities and calendar of the South African Presidency. The theme for South Africa's G20 Presidency will be "Solidarity, Equality and Sustainability". As Minister Nzimande had outlined on Tuesday, science, technology and innovation have a crucial role to play to underpin the global commitment to these values set out in the theme of our Presidency.

The G20, thus, has a dedicated science, technology and innovation track, referred to as the Research and Innovation Working Group, over which Minister Nzimande will preside in 2025. The theme for this track, aligned with our principal G20 theme, is to promote equity in science, technology and innovation for sustainable development. This theme was chosen as fairness in the conduct of the science, technology and innovation enterprise is a prerequisite to truly advance inclusive sustainable development.

The G20 Research and Innovation Working Group, in turn, will focus its efforts on thematic priorities, such as harnessing open innovation for sustainable development; leveraging access to biodiversity information for sustainable development; and promoting diversity, equity, inclusion and accessibility in science, technology and innovation. Our G20 programme will, for example, also include dedicated gatherings of science academies, science advisors, space agencies, startups and marine scientists. The G20 programme of science, technology and innovation engagement is certainly not the preserve of governments alone and, like our Science Forum programme, where appropriate, will be open to all who want to join our campaign for a renewed commitment to solidarity, equality and sustainability in global affairs.

I am delighted that by focusing debates on several of these priorities, the Science Forum South Africa 2024 has helped to lay a firm foundation for the work of the G20 Research and Innovation Working Group in 2025. We look forward to remaining in touch with all of you through your digital communication channels to keep you informed of, but also to invite you to the programme. As we prepare to host the world in 2025, from my South African compatriots, I ask that we will all be proud ambassadors of our beautiful country and the values we stand for.

In conclusion, the Science Forum South Africa will be nothing without its people. I would again like to thank all who contributed to its success, starting of course with

our host, Minister Nzimande, for his visionary leadership, strategic direction and unwavering support. On behalf of the Minister and myself, I would also like to acknowledge the hard work by the dedicated group of Department of Science, Technology and Innovation and CSIR officials responsible for the Forum's organisation, led by our Forum coordinator, Ms Vinny Pillay – thank you dear colleagues. The Forum's success would not have been possible without the various session organisers, moderators, speakers and panelists. To all of you I would like to say thank you – thank you for contributing your time, thoughts and reflections. These sessions would not have been characterised by the vibrant, stimulating and provocative debate, if it was not for all the forum participants. Thank you all for taking the time to attend.

Your commitment to engage and your courage to challenge where necessary are what set Science Forum South Africa apart. As indicated by Dr Pandor yesterday, the strong and enthusiastic participation of the younger generation is clear evidence that the future of the Science Forum South Africa to continue as a platform for vibrant debate, igniting conversations about science, is secured.

Lastly, I would like to thank all our international guests, especially from elsewhere in Africa, for visiting us. I trust your time in South Africa had been a productive and enjoyable one. I wish you all safe homeward journeys and look forward to seeing you again at the Science Forum South Africa 2025.

As I bid you goodbye, I would like to wish everyone, also on behalf of Minister Nzimande, a restful and safe holiday season, and everything of the best for the new year.

I would like to leave you with the words of President Nelson Mandela, first President of a democratic South Africa. Madiba once said that a good head and a good heart are always a formidable combination. There is much work to be done, using our heads, and our hearts.

*By Deputy Minister of Science, Technology and Innovation,
Nomalungelo Gina*

SCIENCE FORUM SOUTH AFRICA ends on high note

Sixty-eight sessions, 80 exhibitions, three high-level plenaries and exhibitor awards were some of the highlights from this year's Science Forum South Africa (SFSA). With more than 5 000 participants, this year's event was a huge success. The week-long event concluded on Friday, 6 December, with awards for outstanding work in science diplomacy and outstanding exhibitions.



At Friday's closing ceremony, panelists were unanimous that this year's SFSA reinforced itself as the foremost platform for scientific dialogue where science policy meets society. The event was praised for its continental focus, offering a stage to African leaders who showcased inclusive and impactful science taking place in their countries.

"We've seen the power of partnership at the forum, whether it is between nations, organisations or disciplines.

It was a key feature this year," said Dr Thandi Mgwebi, Group Executive: Business Advancement at the National Research Foundation.

Prof. Rémi Quirion, Chief Scientist of Québec, Canada, was impressed by the energy and optimism he witnessed at the forum and emphasised the power of partnership in research.

"Building research projects and research policies has much more impact when you do it together."



Prof. Quirion said that the government of Québec was planning to establish several research chairs on science diplomacy, and he would recommend that one of those chairs be established with the Science Diplomacy Capital for Africa.

Ms Thulile Khanyile, an entrepreneur and scientist who also participated in the panel, said that her highlight from this year's forum was the participation of young people, from learners and undergraduates to post-graduates, who all expressed interest in the commercialisation of innovation and job creation within the national system of innovation.

Several awards were also made during the closing ceremony. The British High Commission in Pretoria, a strategic international partner in science, technology and innovation (STI), won the award for the best international exhibitor, while the Academy of Science for South Africa won the best overall exhibitor prize. A special award was made posthumously to Mr Somila Xosa, who was the Director of Transport Fuels at the Department of Science and Innovation, in recognition of his contribution to science diplomacy. His family accepted the award.

The Science Advice with Global Impact Award was made to Mr Carlton Lufuno Mukwevho, Secretary-General of South African National Commission for UNESCO. Ms Jacqueline Friedenthal, Science and Technology Counsellor at the Swiss Embassy in South Africa, scooped an award in the Transformative International STI Partnerships with South Africa category.

Former Director-General of the Department of Science and Innovation, Dr Phil Mjwara, received a Lifetime Contribution in International STI Cooperation to Serve

Society Award for his efforts at building international networks benefitting South Africa.

A Special Gratitude Award was also made to Scientific and Technology Minister Counsellor Shen Long from the Chinese Embassy in South Africa.

Deputy Minister of STI, Ms Nomalungelo Gina, congratulated the winners and thanked the science diplomacy winners for their efforts to harness international cooperation in science to help making our world more caring, more just and more sustainable.

The Deputy Minister also appreciated the closing panel's suggestions on co-creating the Science Forum 2025, which will take place alongside the World Conference of Science Journalists next year. "As our Minister emphasised in his opening address, we need to communicate more, and better, on the role of science in society, and I am confident that the Forum in 2025, like this year, will continue to ignite conversations about science."

With South Africa taking over the G20 chair from Brazil, Ms Gina said that SFSA 2024 helped to lay firm foundation for the work of the G20 Research and Innovation Working Group in 2025.

The Deputy Minister said the success of SFSA would not have been possible without the various session organisers, moderators, speakers and panelists. "To all of you I would like to say thank you – thank you for contributing your time, thoughts and reflection. But these sessions would not have been characterised by the vibrant, stimulating and provocative debate, if was not for all the forum participants. Thank you all for taking the time to attend."



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SCIENCE FORUM SOUTH AFRICA 2024

Igniting conversations about Science

3-6 December 2024
CSIR ICC, Tshwane



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